

CLAIMS

What Is Claimed Is:

1. In an implantable cardiac stimulation device having a preventive overdrive pacing unit, a tachycardia detection unit, an antitachycardia pacing (ATP) therapy unit, and a capture detection unit, a method comprising:

overdrive pacing the heart by delivering overdrive pacing pulses using the preventive overdrive pacing unit;

detecting loss of capture of pacing pulses during preventive overdrive pacing using the capture detection unit;

detecting tachycardia occurring subsequent to a loss of capture using the tachycardia detection unit;

determining, for each tachycardia occurring following a loss of capture, whether the tachycardia spontaneously terminates; and

selectively enabling automatic switching from preventive overdrive pacing to ATP therapy based on a percentage of spontaneously terminating episodes of tachycardia occurring subsequent to loss capture during preventive overdrive pacing.

2. The method of claim 1 wherein selectively enabling automatic switching from preventive overdrive pacing to ATP therapy comprises:

comparing the percentage of spontaneously terminating episodes of tachycardia against a predetermined threshold;

enabling automatic switching from preventive overdrive pacing to ATP therapy if the percentage does not exceed the predetermined threshold; and

disabling automatic switching from preventive overdrive pacing to ATP therapy if the percentage exceeds the predetermined threshold.

3. The method of claim 2 wherein the predetermined threshold is 60%.

4. The method of claim 1 wherein overdrive pacing the heart, detecting loss of capture of pacing pulses during preventive overdrive pacing, detecting tachycardia occurring subsequent to a loss of capture, and determining, for each tachycardia occurring following a loss of capture, whether the tachycardia spontaneously terminates are performed for a predetermined period of time prior to selectively enabling automatic switching from preventive overdrive pacing to ATP.

5. The method of claim 1 wherein overdrive pacing the heart, detecting loss of capture of pacing pulses during preventive overdrive pacing, detecting tachycardia occurring subsequent to a loss of capture, and determining, for each tachycardia occurring following a loss of capture, whether the tachycardia spontaneously terminates are performed for a predetermined number of tachycardia episodes prior to selectively enabling automatic switching from preventive overdrive pacing to ATP.

6. The method of claim 1 wherein the recited method is performed soon after implantation of the implantable cardiac stimulation device.

7. The method of claim 6 wherein the recited method is performed periodically thereafter.

8. The method of claim 1 wherein if automatic switching from preventive overdrive pacing to ATP therapy has been selectively enabled, then performing the following:

- delivering overdrive pacing pulses to the heart using the overdrive pacing unit;

- detecting loss of capture of pacing pulses within the heart using the capture detection unit;

- detecting a tachycardia based on the detection of loss of capture of pacing pulses; and

- switching from preventive overdrive pacing to ATP therapy upon detection of the loss of capture.

9. The method of claim 8 wherein delivering overdrive pacing pulses is performed to deliver pulses at a predetermined maximum pulse magnitude and wherein detecting tachycardia is performed by detecting loss of capture of one or more pacing pulses.

10. The method of claim 8 wherein delivering overdrive pacing pulses is performed to deliver pulses at a pulse magnitude less than a predetermined maximum pulse magnitude and wherein detecting tachycardia is performed by detecting loss of capture of both a pacing pulse and a subsequent backup pulse delivered at the maximum pulse magnitude.

11. The method of claim 8 wherein the stimulation device comprises an automatic stimulation threshold search unit operative to determine a capture threshold for pacing pulses and wherein the method further comprises:

- performing a stimulation threshold search using the stimulation threshold search unit if a pacing pulse is not captured during preventive overdrive pacing but a backup pulse is captured.

12. The method of claim 8 wherein delivering overdrive pacing pulses is performed to deliver preventive overdrive pacing to the atria.

13. The method of claim 12 wherein the stimulation device comprises a premature atrial contraction (PAC) detection unit and wherein the method further comprises:

delivering ATP therapy using the ATP unit upon the detection of a loss of capture of a backup pulse delivered subsequent to detection of a PAC by the PAC detection unit during preventive overdrive pacing.

14. The method of claim 12 wherein the stimulation device includes both a premature atrial contraction (PAC) detection unit and PAC response unit and wherein the method further comprises:

activating the PAC response unit upon the detection of a PAC by the PAC detection unit during preventive overdrive pacing.

15. In an implantable cardiac stimulation device for implant within a patient, a system comprising:

an overdrive pacing unit operative to deliver overdrive pacing pulses to the heart for preventing a tachycardia;

an antitachycardia pacing (ATP) therapy unit operative to deliver antitachycardia pacing therapy to the heart; and

a capture-based tachycardia detection unit operative to detect a tachycardia based upon loss of capture of pacing pulses; and

a control unit operative to control the overdrive pacing unit and the ATP unit and to selectively enable automatic switching from preventive overdrive pacing to ATP therapy based on a percentage of spontaneously terminating episodes of tachycardia occurring subsequent to loss capture during an initial period of preventive overdrive pacing.

16. The system of claim 15 wherein the control unit selectively enables automatic switching from preventive overdrive pacing to ATP therapy by comparing the percentage of spontaneously terminating episodes of tachycardia against a predetermined threshold, enabling automatic switching from preventive overdrive pacing to ATP therapy if the percentage does not exceed the predetermined threshold, and disabling automatic switching from preventive overdrive pacing to ATP therapy if the percentage exceeds the predetermined threshold.

17. The system of claim 16 wherein the predetermined threshold utilized by the control unit is 60%.

18. The system of claim 16 wherein the control unit is operative to selectively enable automatic switching from preventive overdrive pacing to ATP therapy following the initial period of preventive overdrive pacing defined by a predetermined period of times.

19. The system of claim 16 wherein the control unit is operative to selectively enable automatic switching from preventive overdrive pacing to ATP therapy following the initial period of preventive overdrive pacing defined by a predetermined number of tachycardia episodes.

20. An implantable cardiac stimulation device comprising:
means for overdrive pacing the heart by delivering overdrive
pacing pulses to prevent a tachycardia;
means for detecting loss of capture of pacing pulses during
preventive overdrive pacing;
means for detecting tachycardia occurring subsequent to a loss of
capture;
means for determining, for each tachycardia occurring following a
loss of capture, whether the tachycardia spontaneously terminates; and
means for selectively enabling automatic switching from preventive
overdrive pacing to ATP therapy based on a percentage of spontaneously
terminating episodes of tachycardia occurring subsequent to loss capture
during preventive overdrive pacing.

21. The system of claim 20 wherein the means for selectively
enabling automatic switching from preventive overdrive pacing to ATP
therapy includes:
means for comparing the percentage of spontaneously terminating
episodes of tachycardia against a predetermined threshold;
means for enabling automatic switching from preventive overdrive
pacing to ATP therapy if the percentage does not exceed the
predetermined threshold; and
means for disabling automatic switching from preventive overdrive
pacing to ATP therapy if the percentage exceeds the predetermined
threshold.